Case Report

Malignant meningioma with intra- and extra-cranial extension: A case report

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ABSTRACT

Meningioma is the most common intracranial benign neoplasm. The malignant transformation of this neoplasm is less frequent. Here, we report the case of a 77-year-old male patient who came to our department with a visible mass in the scalp for 1½ years. The mass was gradually increasing in size, soft in nature, not painful, and associated with the left-sided weakness. His multidetector computed tomography showed lesion which is having an intracranial component with the destruction of a vault with extracranial extension. This imaging modality gives a clear-cut picture of the extent of the lesion, nearby structures, and vascularity to give the surgeon proper guidance in two, three, and four dimensions.

Keywords: *Extracranial extension, Meningioma, Multidetector computed tomography*

Meningioma is one of the most common primary non-glial intracranial neoplasms. The cell of origin is arachnoid meningothelial cells. They occur predominantly in males and can be seen anywhere in the central nervous system, i.e., brain or spinal cord. They are commonly located in the parasagittal convexity and sphenoid ridge. Neoplasm in this location is rare and account for only 1–3% of all meningiomas [1]. We are presenting a case of malignant meningioma with characteristic multidetector computed tomography (MDCT) findings. We are presenting this case due to rarity and intra- and extra-cranial extension.

CASE REPORT

A 77-year-old male patient reported with the complaints of a large visible mass on the head which was gradually increasing in size for 1½ with an onset of the left-sided weakness for 1 week. There was no history of trauma, fever, pain, or bleeding from the site of swelling. They have not contacted any physician for the same complaint. The patient had been diagnosed to have prostatic cancer 10 years ago, had undergone surgery and radiotherapy for the same, following which he was cured.

On clinical examination, the patient was conscious and oriented with stable vitals. On local examination, a well-defined, fluctuant, soft to firm in consistency, non-mobile, and mildly tender mass (around 3 cm) was present on the skull. There was no associated ulceration. On nervous system examination, power on the upper and lower limbs of the left side was 2/5. Hypertonia was noted on the left side and plantar reflex was mute. The right side was normal. The patient had no neurologic deficit. Rest of the systemic examination including vitals were unremarkable.

The patient underwent plain multidetector CT scan of the brain in a 128 slice CT Siemens Perspective, and a clear defect was shown in the topogram (Fig. 1). It showed a well-defined, irregular predominantly hyperdense heterogeneous mass measuring 3 cm × 3.1 cm × 5.2 cm in the right high parietal region crossing the midline for about 1.7 cm to the left and perilesional edema in the right centrum semi-ovale and corona radiata (Fig. 2a). MDCT showed sharply delineated, hyperdense lesion in relation to the inner and outer tables. The intracranial portion was showing squeezing cerebrospinal fluid with buckling of white matter and obliterating subarachnoid spaces (Fig. 2b). The lesion caused erosion of the right bilateral parietal bones more than the left as a bony defect with a maximum diameter of 5.3 × 5.2 cm and an extracalvarial soft tissue swelling measuring 2.3 cm × 8.2 cm × 7.8 cm with bony specks or calcifications (Fig. 3). Lacunar infarcts were also noted in the right basal ganglia. The three-dimensional (3D) reconstructions showed multiple vessels, leading to the surface of the extracalvarial mass as the bulge, vessels, and a destructive hole in calvarium (Fig. 4). A fine-needle aspiration cytology was also done. All the above-mentioned investigations confirmed the mass to be a malignant meningioma.

A surgical correction of the mass was planned and is in process. The surgical correction will be done in multiple steps such as resection and cranioplasty. Other surgical steps will be taken if required to maintain the neurological status.

Figure 1: Lateral topogram showing bony defect

Figure 3: Higher axial image showing bone defect

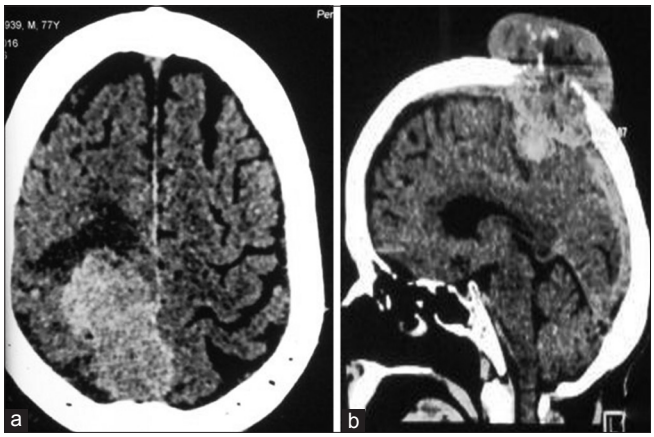

Figure 2: (a) Multidetector computed tomography high parietal region showing enhancing mass squeezing brain; (b) Multidetector computed tomography sagittal image showing intra- and extra-cranial mass extension

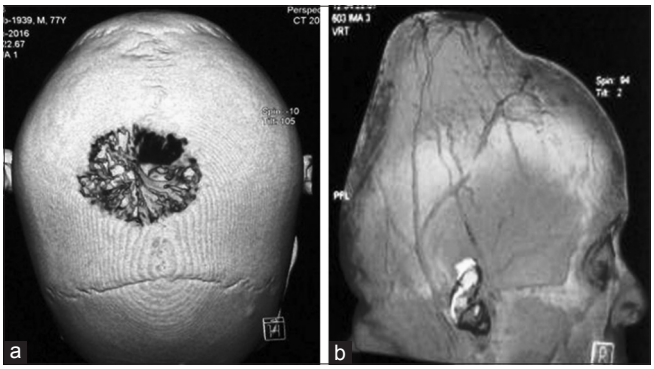

Figure 4: (a) Three-dimensional (3D) image showing high right parietal bony defect; (b) 3D image showing soft tissue mass and multiple vascular channels

DISCUSSION

Meningiomas are the most common extra-axial and non-glial tumors of the brain. They account for one-third to one-fourth of primary intracranial neoplasms. They constitute 25% of all spinal tumors. The average incidence of meningioma is 2–3/100,000 population/year with peak incidence being 40–55 years. It increases to 8.4 in the 7th decade [2]. Grossly, they are of variable shapes such as spherical, globular, flat, plaque, bilobed, dumbbell, or butterfly with sharply demarcated boundaries. The most common location is supratentorial overlying the lateral hemispherical convexity in 34% of cases [2].

Although they have been described as early as the year 1600, the term meningioma was coined by Harvey Cushing, in 1922 [3]. Antoine Luis, in 1770, performed the first successful surgery to remove a meningioma [3]. Majority of them have inactivation of NF2 gene product due to 22q deletion [4]. Higher grade lesions have allelic losses on 1p and 3p [4]. Most of them are benign and produce symptoms due to local compression [5]. They are more common in females due to hormonal sensitivity with a ratio of female: male up to 4:1, but malignant meningiomas show male preponderance.

The WHO has classified meningiomas into three grades: Grade I- typical meningioma (90–95%): Benign, low risk of recurrence (7–25%) and aggressive growth; Grade II - atypical (5%): Increased mitotic activity and greater likelihood of recurrence (29–52%); and Grade III -malignant or anaplastic (1–3%): Increased cellular atypia, parenchymal invasion, and recurrence rate of 50–94% [4,5]. These meningiomas show features of malignancy and invade the brain parenchyma. They show cellular atypia, cell cycle dysregulation, and loss of differentiation and have markedly elevated mitotic index of more than 20/10 high-power field [6]. They may be associated with necrosis or hemorrhage. They are divided into papillary and rhabdoid subtypes and are characterized by a triad of extracranial mass, osteolysis, and mushrooming intracranial tumor [3]. Our case showed the characteristic triad of malignant meningioma.

MDCT plays a major role in diagnosing and also helps in visualizing the extent of the intracranial and extracalvarial masses in great detail. The bony involvement can also be studied with great accuracy with the help of the submillimeter reconstructed images. All images are isotropic, i.e. having same sharpness from any angle. The 3D reconstruction helps to see the mass in a different perspective as well as the surface vessels. The image in the fourth dimension is motion evaluation of image and we can see all the 360°, it makes a roadmap for surgeon before planning for the operation.

CONCLUSION

A meningioma with intracranial and extracranial extension is very unusual and our case was Grade III malignant meningioma with clear-cut depiction by MDCT. The lesion should be followed with appropriate imaging studies and a surgical resection of the tumor along with cranioplasty should be done in such cases.

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